

QUARTERLY JOURNAL³⁰⁹

OF THE

Royal Meteorological Society

Editor

D. H. McINTOSH

Vol. 105, 1979

ROYAL METEOROLOGICAL SOCIETY
JAMES GLAISHER HOUSE, GRENVILLE PLACE,
BRACKNELL, BERKSHIRE RG12 1BX

1979

CONTENTS OF VOLUME 105

	PAGE
J. T. HOUGHTON—The future role of observations from meteorological satellites— Presidential Address	...
BERT BOLIN—On the role of the atmosphere in biogeochemical cycles—Symons Memorial Lecture	2
J. H. C. GASH—An analytical model of rainfall interception by forests	4
F. F. HILL and K. A. BROWNING—Persistence and orographic modulation of mesoscale precipitation areas in a potentially unstable warm sector	5
A. O'NEILL and B. F. TAYLOR—A study of the major stratospheric warming of 1976/77	7
N. NICHOLLS—A simple air-sea interaction model	9
R. K. SMITH and L. M. LESLIE—A numerical study of tornadogenesis in a rotating thunderstorm	10
P. J. MASON and R. I. SYKES—Separation effects in Ekman layer flow over ridges ...	12
KLAUS FRAEDRICH—Catastrophes and resilience of a zero-dimensional climate system with ice-albedo and greenhouse feedback	14
J. A. GARLAND and R. G. DERWENT—Destruction at the ground and the diurnal cycle of concentration of ozone and other gases	16
A. J. CRANE—Aspects of the energetics of the upper stratosphere during the January- February 1973 major sudden warming	18
J. L. MONTEITH and D. R. BUTLER—Dew and thermal lag: a model for cocoa pods ...	20
HERBERT RIEHL—Occurrence and structure of the equatorial trough zone in Venezuela	21
S. J. CAUGHEY and J. C. WYNGAARD—The turbulence kinetic energy budget in convective conditions	23
JAMES MCGREGOR and W. A. CHAPMAN—Stratospheric temperatures and geostrophic winds during 1973-1974	24
G. B. TUCKER—The observed zonal wind cycle in the southern hemisphere stratosphere	26
J. S. FOOT—Spectrophone measurements of the absorption of solar radiation by aerosol	27
RONALD B. STANDLER and WILLIAM P. WINN—Effects of coronae on electric fields beneath thunderstorms	28
Notes and Correspondence—	
P. H. KAHN and J. A. BUSINGER—The effect of radiative flux divergence on entrainment of a saturated convective boundary layer	3
A. P. CLULEY and M. J. OLIVER—An observation of unusually high humidity in the lower stratosphere	3
ROBERT E. ESKRIDGE and PHANINDRAMOHAN DAS—Comment on the paper entitled 'Tornado- genesis' by R. K. Smith and L. M. Leslie (<i>Q.J.</i> , 1978, 104, 189-199). With reply ...	3
R. A. ANTONIA and L. W. B. BROWNE—Comments on the paper 'Relations between surface fluxes and mean profiles of velocity, temperature and concentration, downwind of a change in surface roughness' by P. J. Mulhearn (<i>Q.J.</i> , 1977, 103, 785-802). With reply	3
Letter to the Editor	3
Reviews—	
<i>Climate and building in Britain</i> , R. E. Lacy (C. B. Wilson); <i>Daylight and its spectrum</i> (second edition), S. T. Henderson (M. H. Unsworth); <i>Climate, water and agriculture in the tropics</i> , I. J. Jackson (A. S. Thom); <i>Micrometeorology</i> , O. G. Sutton (M. H. Unsworth); <i>Climatic change</i> , Ed. by John Gribbin (P. M. Kelly); <i>Waves in fluids</i> , James Lighthill (P. G. Drazin)	
Election to Membership	3
Obituary Notice	3

I. C. DAVIES—Phase-lagged wave-CISK	325
I. C. WELLS—A coupled ocean-atmosphere experiment: The ocean response	355
K. JAMES and K. A. BROWNING—Mesoscale structure of line convection at surface cold fronts	371
J. MASON and R. I. SYKES—Flow over an isolated hill of moderate slope	383
V. H. MOORES, S. J. CAUGHEY, C. J. READINGS, J. R. MILFORD, D. A. MANSFIELD, S. ABDULLA, T. H. GUYMER and W. B. JOHNSTON—Measurements of boundary layer structure and development over SE England using aircraft and tethered balloon instrumentation	397
C. R. HUNT and A. H. WEBER—A Lagrangian statistical analysis of diffusion from a ground-level source in a turbulent boundary layer	423
G. J. DYER—Rainfall along the east coast of southern Africa, the southern oscillation, and the latitude of the subtropical high pressure belt	445
P. LOZOWSKI and A. G. BEATTIE—Measurements of the kinematics of natural hailstones near the ground	453
Y. MOLNÁR—Interpretation of Nimbus 5 SCR data for obtaining vertical temperature profiles	461
M. MAHRT—Penetrative convection at the top of a growing boundary layer	469
JAMES J. SIMPSON and CLAYTON A. PAULSON—Mid-ocean observations of atmospheric radiation	487
Reviews—	
<i>Lightning</i> , Volume 1, <i>Physics of lightning</i> , Ed. by R. H. Golde (B. J. Mason); <i>Fluid mechanics</i> , R. H. Rogers (R. K. Smith); <i>Review of modelling and prediction of the upper layers of the ocean</i> , Ed. by E. B. Kraus (I. S. Robinson)	503
Erratum	505
Section to Membership	507
J. CRANE—Annual and semiannual waves in the temperature of the mesosphere as deduced from Nimbus 6 PMR measurements	509
ERNEST W. PETERSON, NIELS OTTO JENSEN and JØRGEN HØJSTRUP—Observations of downwind development of wind speed and variance profiles at Bognaes and comparison with theory	521
RASMUSSEN—The polar low as an extratropical CISK disturbance	531
P. EVANS and D. R. DAVIES—On the use of an analytic solution in estimating eddy viscosity distribution and water vapour flux in a mature hurricane	551
J. P. CULLEN and C. D. HALL—Forecasting and general circulation results from finite element models	571
D. STEVEN and M. H. UNSWORTH—The diffuse solar irradiance of slopes under cloudless skies	593
T. ROACH and A. SLINGO—A high resolution infrared radiative transfer scheme to study the interaction of radiation with cloud	603
F. RYAN and P. LALOUSIS—A one-dimensional time-dependent model for small cumulus	615
M. CARPENTER—An experimental forecast using a non-hydrostatic mesoscale model	629
B. TUCKER—Transient synoptic systems as mechanisms for meridional transport: an observational study in the southern hemisphere	657
R. MILFORD, S. ABDULLA and D. A. MANSFIELD—Eddy flux measurements using an instrumented powered glider	673

E. F. BRADLEY and R. A. ANTONIA—Structure parameters in the atmospheric surface layer	69
M. J. COUGHLAN—Recent variations in annual-mean maximum temperatures over Australia	70

Notes and Correspondence—

P. J. MULHEARN—A note on momentum transfer above very rough surfaces	72
PETER V. HOBBS and KUMUD R. BISWAS—The cellular structure of narrow cold-frontal rainbands	72

Reviews—

<i>Environmental impacts of artificial ice nucleating agents</i> , Ed. by D. A. Klein (P. R. Jonas); <i>Simulation of assimilation, respiration and transpiration of crops</i> , by D. T. de Wit <i>et al.</i> (T. Woodhead); <i>The upper atmosphere and magnetosphere</i> , Ed. by the Geophysics Study Committee, National Academy of Sciences, Washington, D.C. (D. M. Willis); <i>Meteorology – an introductory course</i> , by Arnt Eliassen and Kaare Pedersen (A. Gilchrist); <i>Annual Report of the Meteorological Office 1977</i> , (Samuel Curran); <i>Fluctuations of glaciers, 1970–1975, Vol. III</i> , by Fritz Müller (L. D. Williams)	72
---	----

Report of the Council for 1978	73
Election to Membership	75
Obituary Notices	75
A. A. WHITE and A. M. GADIAN—Baroclinic instability governed by the modified quasi-geostrophic equations	75
D. FOWLER and M. H. UNSWORTH—Turbulent transfer of sulphur dioxide to a wheat crop	76
S. NICHOLLS and C. J. READINGS—Aircraft observations of the structure of the lower boundary layer over the sea	78
T. N. PALMER—Incorporation of climatology into a Backus–Gilbert variational scheme for atmospheric temperature retrieval	80
S. J. CAUGHEY and S. G. PALMER—Some aspects of turbulence structure through the depth of the convective boundary layer	81
P. J. MASON and R. I. SYKES—On the net forces produced by surface-mounted obstacles	82
B. L. SAWFORD—Wind direction statistics and lateral dispersion	84
E. O. HOLOPAINEN and K. EEROLA—A diagnostic study of the long-term balance of kinetic energy of atmospheric large scale motion over the British Isles	84
E. O. HOLOPAINEN—A diagnostic study of the long-term budget of momentum of atmospheric large scale motion over the British Isles	85
JUHANI RINNE and VESA KARHILA—Empirical orthogonal functions of 500 mb height in the northern hemisphere determined from a large data sample	87
JUHANI RINNE and SIMO JÄRVENOJA—Truncation of the EOF series representing 500 mb heights	88
M. J. MANTON—On the broadening of a droplet distribution by turbulence near cloud base	89
TETSUJI YAMADA and GEORGE L. MELLOR—A numerical simulation of BOMEX data using a turbulence closure model coupled with ensemble cloud relations	91
D. A. BENNETTS and B. J. HOSKINS—Conditional symmetric instability – a possible explanation for frontal rainbands	94
H. R. A. WESSELS—Growth and disappearance of evaporation fog during the transformation of a cold air mass	96
T. N. KRISHNAMURTI, HUA LU PAN, CHIA BO CHANG, JEFF PLOSHAY, DAVID WALKER and A. WAHED OODALLY—Numerical weather prediction for GATE	97
P. C. MANINS and B. L. SAWFORD—Katabatic winds: A field case study	101
CLAUDIO TOMASI—Non-selective absorption by atmospheric water vapour at visible and near infrared wavelengths	102
A. J. ARNFIELD—Evaluation of empirical expressions for the estimation of hourly and daily totals of atmospheric longwave emission under all sky conditions	104

OGAR L. ANDREAS and CLAYTON A. PAULSON—Velocity spectra and cospectra and integral statistics over Arctic leads	1053
Notes and Correspondence—	
C. J. STIGTER—Comparison and combination of two recent proposals for a generalized Penman equation	1071
B. B. HICKS, G. D. HESS and M. L. WESELY—Analysis of flux-profile relationships above tall vegetation—an alternative view. With replies	1074
WILLIAM P. ELLIOTT and R. K. REED—Comments on paper, 'A temperature correction for Tucker's ocean rainfall estimates' by Clive E. Dorman and Robert H. Bourke (<i>Q.J.</i> , 104 , 765–773)	1082
Reviews—	
<i>Rotating fluids in geophysics</i> , Ed. by P. H. Roberts and A. M. Soward (R. S. Scorer); <i>Boundary layer climates</i> , T. R. Oke (N. Thompson); <i>Microphysics of clouds and precipitation</i> , H. R. Pruppacher and J. D. Klett (J. Latham); <i>Saharan dust</i> , Ed. by C. Morales (G. Farmer)	1084
ection to Membership	1087
dex	1089
ewly elected members	1094

